Qu Machine on Shelf
Rec'd Well Wella dtd 5/29/95

Yucca Mountain Site Characterization Project

INTEGRATED LOGISTIC SUPPORT PLAN FOR THE MINED GEOLOGIC DISPOSAL SYSTEM

YMP/93-19

Revision 0

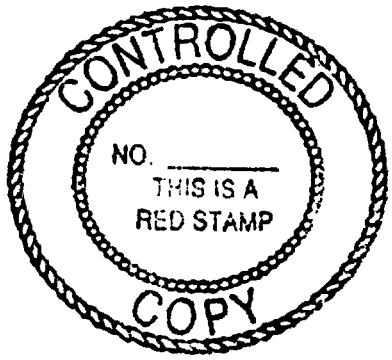
INFORMATION ONLY

March 1995

U.S. Department of Energy
Office of Civilian Radioactive Waste Management
Las Vegas, NV 89109

CHANGE HISTORY

REV. NO.	ICN NO.	EFFECTIVE DATE	DESCRIPTION OF CHANGE
0		05/11/95	Initial issue



Wesley E. Barnes, Project Manager
Yucca Mountain Site Characterization Office

3/20/95
Date

For Steve J. Brocoum
Assistant Manager for Suitability and Licensing
Yucca Mountain Site Characterization Office

3/3/95
Date

Richard L. Craun
Assistant Manager for Engineering and Field Operations
Yucca Mountain Site Characterization Office

3/16/95
Date

FOREWORD

The purpose of the Integrated Logistic Support Plan (ILSP) for the Mined Geologic Disposal System (MGDS) is to specify management controls necessary to integrate all the MGDS contracted logistic efforts. These logistic efforts include commercial equipment selection criteria for supportability; special equipment design for supportability; equipment maintenance practices, including maintenance response levels and maintenance records; minimum levels of supply support required; MGDS Participant support interfaces; status reporting; problem identification and resolution; and other logistic functions as identified in this ILSP.

The Civilian Radioactive Waste Management System (CRWMS) Management and Operating Contractor (M&O) will develop an Integrated Support Plan (ISP) describing their plan to execute the management direction contained in this ILSP. The initial ISP will be submitted for Yucca Mountain Site Characterization Office (YMSCO) approval and resubmitted following each design review of the potential repository as required to maintain currency. The ISP will be submitted for final approval 90 days after the final detail design review.

This ILSP is prepared under the guidance of the Office of Civilian Radioactive Waste Management (OCRWM) *Systems Engineering Management Plan*, DOE/RW-0051, Section 4.3, which directs the implementation of an Integrated Logistic Support (ILS) program for all projects. The plan is intended to serve as a working document for those activities directly responsible for the planning, management, and execution of the ILS program.

This ILSP will be updated as necessary during the life of the MGDS and will be considered directive in nature. Conflicts with other directives and/or recommendations for change will be forwarded to the YMSCO Integrated Logistic Support Manager (ILSM) for action, with an information copy to the CRWMS M&O ILSM.

Following U.S. Department of Energy (DOE) approval, the ILSP will be placed under control of the YMSCO ILSM, with administrative changes performed by the CRWMS M&O as directed. An ILSP decision log and minutes of all ILS technical interchanges will be maintained by the CRWMS M&O ILSM.

The objectives of this ILSP are to:

- Establish ILS program responsibilities for MGDS Program Participants.
- Establish minimum levels of support and documentation for MGDS logistic activities.
- Describe how operations and maintenance (O&M) logistic support will be achieved for each phase of the MGDS (see Table 2-1).
- Describe the processes necessary to identify all relevant logistic elements to achieve a fully supportable repository.
- Describe the ILS information necessary for milestone reviews.
- Provide a complete plan describing the process to achieve a fully supportable repository at site operational activation.

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

LIST OF FIGURES

LIST OF TABLES

1.0 GENERAL

1.1 SYSTEM DESCRIPTION

The Nuclear Waste Policy Act of 1982 (NWPA) established the OCRWM in the DOE to implement a program for the safe and permanent disposal[1] of spent nuclear fuel and high level radioactive waste in a geologic repository. To achieve this objective, the OCRWM has developed the CRWMS, which consists of the following four system elements: the Waste Acceptance System, the Transportation System, the Monitored Retrievable Storage facility, and the MGDS. This plan pertains to the MGDS element of the CRWMS.

1.2 PROJECT DESCRIPTION

The MGDS is to be conducted in two distinct phases. The first is the site characterization phase, during which scientists will study Yucca Mountain to determine its suitability to house a potential nuclear waste repository. If Yucca Mountain is found suitable and the DOE is directed to build the repository, the second phase will begin. In phase two the MGDS will provide all the facilities, functions, and activities required to receive, emplace, and monitor nuclear waste in a geologic medium and isolate nuclear wastes from the accessible environment.[1] The MGDS site description is defined in the *Conceptual Design of a Repository (Basis for Site Characterization Plan, Chapter 8)*, YMP/CM-0009.

1.3 PROJECT MANAGEMENT

1.3.1 Implementing Agency

The OCRWM is responsible for managing the development of the CRWMS. The OCRWM Director has assigned the responsibility for directing the design and development of the YMP waste package and repository to the Office of Geologic Disposal (OGD).

The MGDS is conducted under the direction of the YMSCO within the OGD, which is headed by the Associate Director for the OGD. Overall policy planning and management of the MGDS are carried out by the MGDS Project Manager, either directly or through principal participants under the direction of the Associate Director of the OGD.

[1]The term "disposal" is defined in the law as: "the emplacement in a repository of high level radioactive waste, spent nuclear fuel or other highly radioactive material with no foreseeable intent of recovery, whether or not such emplacement permits the recovery of such waste" [NWPA Sec2(9)]. This "disposal" isolates the radioactive wastes from the accessible environment (10 CFR 60.2 - the atmosphere, land surfaces, oceans, and all of the lithosphere that is beyond the controlled area) via a disposal system. The disposal system is the combination of engineered and natural barriers that isolate these radioactive wastes from the biosphere after emplacement.

1.3.2 CRWMS M&O

TRW Environmental Safety Systems, Inc., leads the CRWMS M&O. The CRWMS M&O's project management responsibilities encompass the management and implementation of the MGDS ILS program. Within the CRWMS M&O's organization the direction and management of the ILS program is the responsibility of the Systems Engineering Department. Implementation of the ILS program policies and daily guidance responsibilities are assigned to the ILSM.

1.3.3 CRWMS M&O Teammates

The CRWMS M&O Teammates are presented in Figure 1-1.

1.3.4 MGDS Participants

The MGDS organizational chart is presented in Figure 1-2.

1.3.5 Integrated Logistic Support Management Team (ILSMT)

An ILSMT will be established with representation, as required, from the implementing agency, the CRWMS M&O, and MGDS Participants. The purpose of the ILSMT is to provide technical support to the MGDS to ensure that logistic support is planned for and integrated throughout the acquisition cycle. The ILSMT will be the interface between the DOE, CRWMS M&O, and MGDS Participant Organizations. The constructor and operator participation in the ILSMT is especially important for the accomplishment of ILS during the site characterization phase.

The ILSMT chairperson will be the YMSCO ILSM, and the co-chairperson and ILSMT administrator will be the CRWMS M&O ILSM. Team membership will consist of logistic representatives from the MGDS Participant Organizations and other affected personnel/activities on an as required basis, for example, Test; Engineering Specialties (Reliability, Availability, and Maintainability [RAM], Human Factors Engineering, etc.); Training; Surface and/or Subsurface Design, etc. The CRWMS M&O Specialty Engineering manager and/or the CRWMS M&O ILSM, in conjunction with the DOE ILSM, will identify needed specialties as required.

The ILSMT member organizations, identified above, will provide a letter of delegation identifying team members to the CRWMS M&O ILSMT administrator not later than the first ILSMT meeting. A new letter of delegation will be submitted when membership changes occur. Team member information will include agency or company, individual's name, position or title, office symbol, mailing address, and phone number. The ILSMT administrator will provide a consolidated listing of current ILSMT membership to each member.

During the first ILSMT membership meeting an ILSMT charter will be established and the ILSMT responsibilities, outlined in Section 1.3.5.1, will be addressed and acted upon.

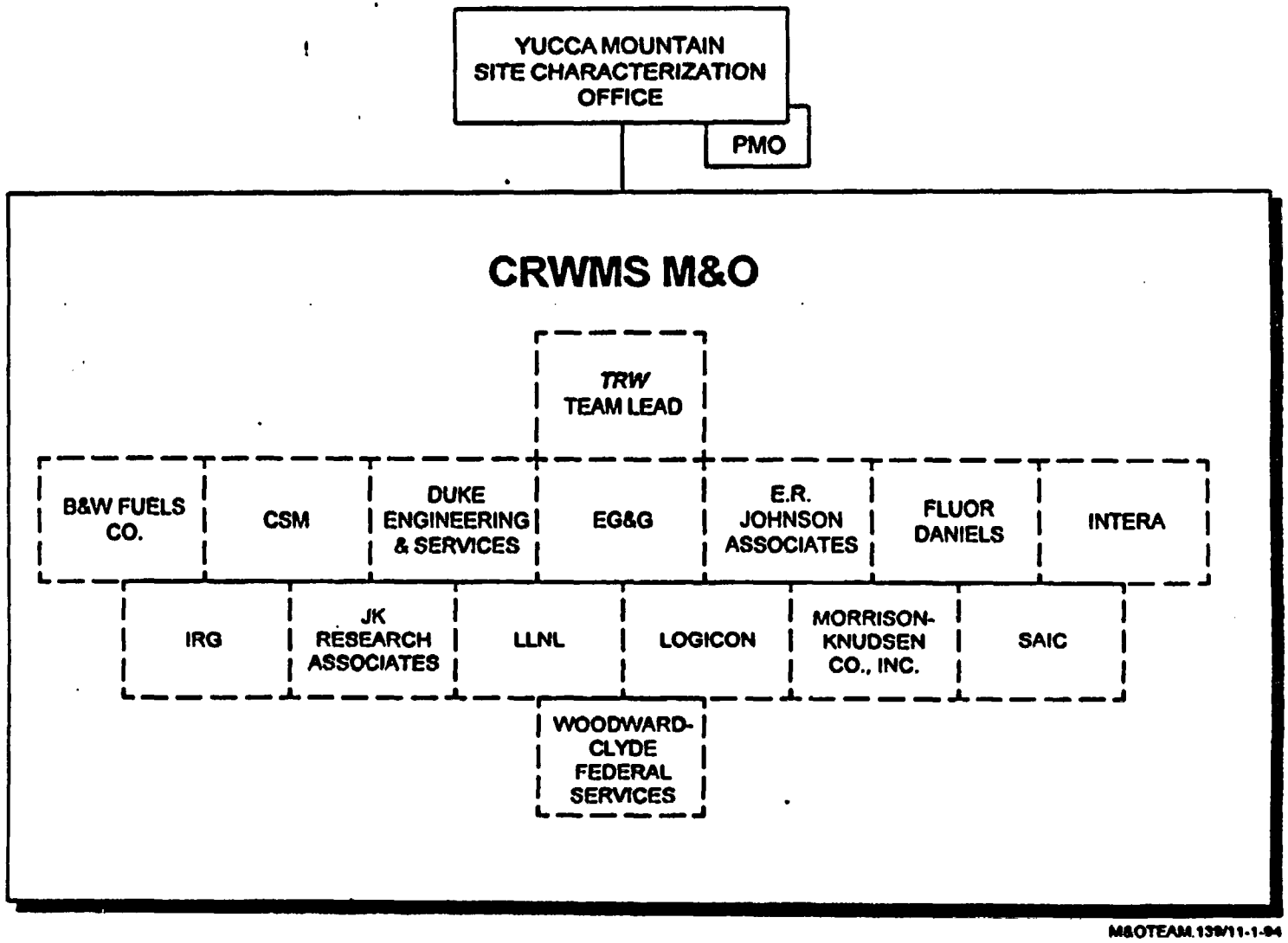


Figure 1-1 CRWMS M&O Teammates

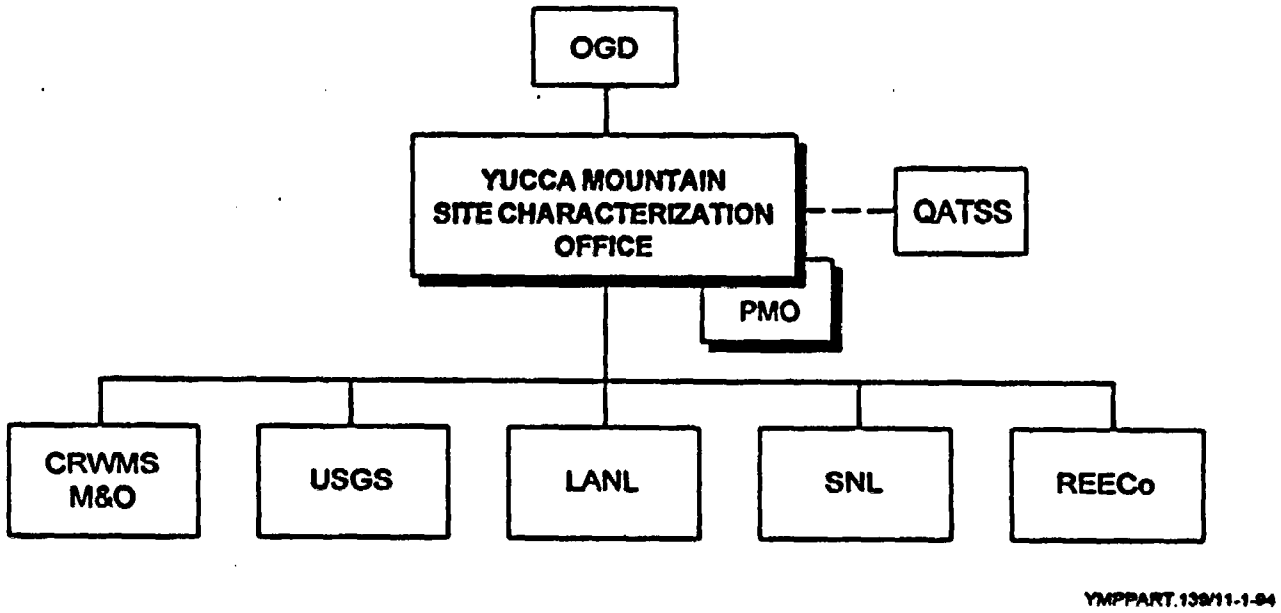


Figure 1-2 Yucca Mountain Site Characterization Project Participants

1.3.5.1 ILSMT Responsibilities

The ILSMT will have, as a minimum, the following functional responsibilities:

- Establish a delivery/suspense schedule for the requirements established in this paragraph.
- Evaluate/establish and publish procedures for MGDS Participants to recommend equipment to be purchased by DOE and submit recommended procedures/changes for YMSCO approval.
- Establish and document ILSMT procedures for reviewing, logging, tracking, and disposition action of purchases of equipment recommended to DOE by MGDS Participants and submit for YMSCO approval.
- Ensure all procedures that may be quality affecting, generated as a result of this plan, are in compliance with the requirements of the OCRWM *Quality Assurance Requirements and Description*, DOE/RW-0333P.
- Identify and recommend to the YMSCO a system or method of developing and maintaining maintenance and operational functional flow diagrams and functional requirements and submit for YMSCO approval.
- Evaluate existing Administrative Procedures for managing and tracking action items presented to the ILSMT and submit recommendations for changes/new procedures to DOE for approval as required.
- Establish and publish ILSMT review and YMSCO approval procedures for functional flows and requirements. Submit for YMSCO approval after the functional flow system/method has been approved.
- Identify and recommend to the YMSCO a logistic data base that will provide for input, storage, and retrieval of the ILS elements identified in this ILSP. Data base recommendations will be forwarded to the YMSCO for approval as scheduled in the first ILSMT meeting.
- Establish and publish ILSMT review and YMSCO approval procedures for the Logistic Support Analysis Records (LSAR). Submit for YMSCO approval after LSAR data base approval.
- Establish and publish procedures for ILSMT review and YMSCO approval for asset level of repair. Submit for YMSCO approval after LSAR data base approval.
- Monitor the planning and integration efforts of the various logistic elements in their functional areas.
- Review all engineering changes/proposals for impact on ILS requirements.
- Identify MGDS logistic support issues as far in advance as possible and bring them to the attention of the appropriate management personnel for corrective action.

- Coordinate logistic support activities and provide an interface for logistic exchange among and between the elements of OGD, MGDS elements, and MGDS Participants.

1.4 APPLICABLE DOCUMENTS

The following documents provide guidance or criteria necessary to accomplish the functions described in this ILSP (the document hierarchy for this plan is presented in Figure 1-4):

- U.S. Department of Energy, *OCRWM Systems Engineering Management Plan*, DOE/RW-0051, Revision 2, January 5, 1993
- U.S. Department of Energy, *OCRWM Program Management System Manual*, DOE/RW-0043, Revision 5, January 11, 1993
- U.S. Department of Energy, *Major System Acquisition and Major Projects*, DOE Order 4240.1K, June 23, 1992
- U.S. Department of Energy, *Maintenance Management Program*, DOE Order 4330.4A
- U.S. Department of Energy, *Safety Analysis and Review System*, DOE Order 5481.1B, Change 1, May 19, 1987
- 10 CFR Part 60, *Disposal of High-Level Radioactive Wastes in Geologic Repositories*, Code of Federal Regulations, Revision January 1, 1990
- 10 CFR Part 73, *Physical Protection of Plants and Materials*, Code of Federal Regulations
- 40 CFR Part 191, *Environmental Standards for the Management and Disposal of Spent Nuclear Fuel, High-Level and Transuranic Radioactive Wastes*, Code of Federal Regulations
- *Operation and Maintenance Management Plan*, YMP/93-01
- *Reliability, Availability, and Maintainability Plan*, YMP/93-15
- *Systems Engineering Management Plan*, YMP/CC-0007, Revision 4, Draft "A," May 12, 1993
- *Conceptual Design of a Repository (Basis for Site Characterization Plan, Chapter 8)*, YMP/CM-0009

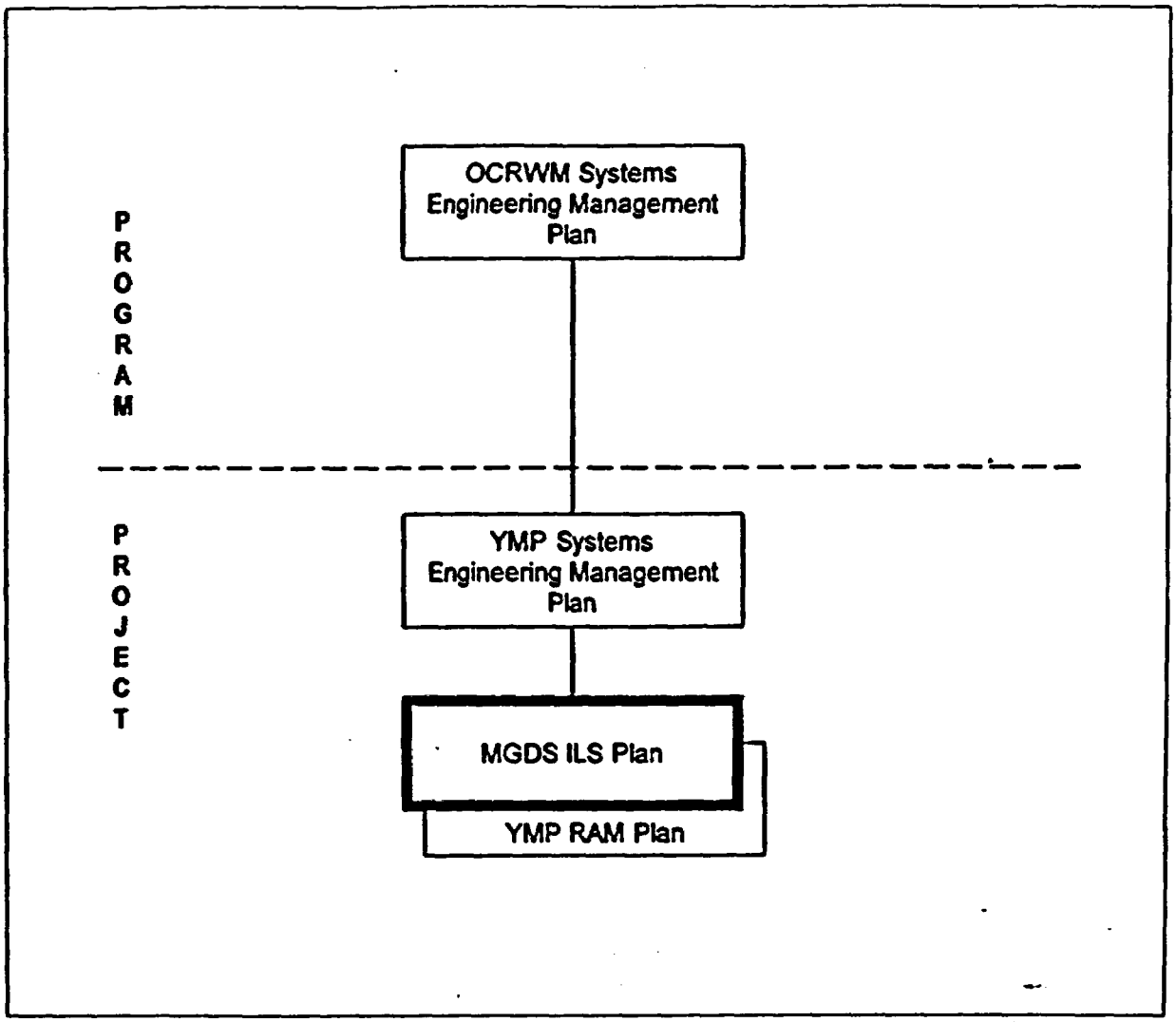


Figure 1-3 ILSP Document Hierarchy

2.0 CONCEPT/STRATEGY

The ILS Program will have limited effects on site characterization, but will focus on ensuring supportability is designed into the Exploratory Studies Facility and assisting other participants/contractors with supportability issues. The ILS Program will increase at the start of Advanced Conceptual Design of the potential repository, where the designs will be reviewed for supportability requirements and the preliminary operation/maintenance task analysis will be accomplished. These analyses will provide supportability inputs into the final design for systems, structures, and components. A record of the preliminary Logistic Support Analysis (LSA) will be stored in the DOE-approved LSA data base as the LSAR. The LSAR will be used to define training, personnel, supply and spares, and requirements, as well as time lines and skill levels. For ILS task timing see Table 2-1.

The O&M concepts below are intended as a starting point for logistic purposes and will be revised as the MGDS program matures and these areas can be more defined.

2.1 OPERATIONS CONCEPT

The MGDS operations concept is derived from the *Conceptual Design of a Repository (Basis for Site Characterization Plan, Chapter 8)*. Detailed operational procedures and requirements will be further defined and documented by the MGDS Participants as specified in this ILSP and in the *Systems Engineering Management Plan* (SEMP), YMP/CC-0007. Logistic analysis considerations will be based on the ILS elements defined in this ILSP. The operations tasks are defined as those actions necessary to process the high-level waste material and to perform potential repository tunneling activities. Operations tasks will also include the procedures and identification of the resource requirements necessary to retrieve the waste from the repository and site decommissioning.

High-level waste processing procedures and identification of resource requirements will be based on the repository processing an anticipated 3400 metric tons yearly, by the year 2015. Shipments are expected to be by rail and truck, up to 70 percent by truck and up to 80 percent by rail, with the capability to convert to 100 percent by rail or truck (*Conceptual Design of a Repository Basis for Site Characterization Plan, Chapter 8*, Table 6-5).

During the LSA process, the MGDS Participants will identify specific equipment and processing functions that are critical to the waste processing flow and could cause processing schedule interruption.

2.2 MAINTENANCE CONCEPT

Maintenance is defined as those actions necessary to repair and/or perform preventive or periodic maintenance and/or servicing of equipment, facilities, and utilities. Maintenance resource requirements will be derived from the operations requirements and documented in the LSAR by the CRWMS M&O. The LSA (see Subsection 2.3) considerations will be based on the maintenance concept and the ILS elements defined in this ILSP.

Table 2-1 ILS Activities During Major Project Milestones

Preliminary Design	Detailed Design	Construction	Operation
Preliminary analyses	Prime systems and equipment validated	Procurement of logistic support items	Supply sustaining support to the following: - Supply - Maintenance - Training - Test and measurement equipment - Personnel - Facilities
Allocation of logistic requirements	LSA concept validation	Inventory control	
LSA data base	LSA	Provisioning	
Preliminary LSA	Design support analysis	Logistic support capability assessment	
Preferred alternative selection	Data collection and feed back	Data collection and feed back	
Design reviews	Design reviews	Verify logistic support concept	Reprovision as required
Update plans and concepts	Update plans and concepts		Update documents required

Operations equipment identified as critical to waste processing will not require scheduled maintenance that will cause interruptions to the waste processing schedule. The mean time to repair critical processing equipment will be no more than eight hours.

2.2.1 Levels of Maintenance

The MGDS will employ the following three levels of maintenance.

- On-Equipment Level
- Off-Equipment Level
- Vendor Level

2.2.1.1 On-Equipment Level Maintenance

On-Equipment Level maintenance is defined as preventive/periodic maintenance, repair, and servicing. The CRWMS M&O will identify and document in the LSAR On-Equipment Level maintenance requirements and task analysis during the LSA process. The LSA process will begin in the conceptual design phase and become more refined through each design phase until all requirements and task procedures are in place and functional at the beginning of the operation phase. The On-Equipment Level initial requirements and task procedures documentation will be completed 90 days after the approval of the detailed design phase and updated as necessary throughout the construction and operation phases.

On-Equipment Level maintenance will consist of repair, by removing and replacing Line Replaceable Units (LRUs), and an effective preventive maintenance program. Maintenance procedures and necessary resources will be identified and documented to the extent necessary to ensure the least amount of interruptions to the waste processing and tunneling operation schedules.

The detailed On-Equipment Level maintenance requirements will be identified during the LSA process and documented in the LSAR data base in terms of:

- Numbers and skills of personnel required to perform each task.
- Identification of spares and number of inventory items needed to perform the tasks and prevent processing schedule interruptions.
- Environmental requirements for personnel and equipment.
- Other maintenance considerations peculiar to the system (i.e., special tools, special equipment, clothing, etc.).
- System calibration support requirements, unique or unusual measurements required.
- Facility and utility service requirements.

2.2.1.2 Off-Equipment Level Maintenance

Off-Equipment Level maintenance requirements will be addressed in terms of the ILS elements during the LSA process and documented in the LSAR. The LSA process will begin during the conceptual phase of the MGDS and continue through the site operation phase. Refinement of Off-Equipment Level maintenance requirements will be accomplished during each phase of the MGDS. The ILS initial documentation process will be completed 90 days after detailed design phase approval and updated as necessary during the construction and operation phases. Off-Equipment Level requirements will be in place and functional at the beginning of the operation phase.

Off-Equipment Level maintenance will consist of repair of the LRUs identified for removal at the On-Equipment Level by removal and replacement of shop replaceable units, support equipment repair, and periodic/preventive maintenance. Each LRU to be removed at On-Equipment Level will be evaluated by means of a repair level analysis (RLA) to determine the most economical and practical means of repair (Off-Equipment, Vendor, or Discard). The RLA may consist of a brief assessment based on experience and knowledge of like items, or it may consist of an in-depth study and the accomplishment of a computerized RLA. RLA candidates will be identified by the CRWMS M&O, documented, and submitted to the ILSMT for review and YMSCO action in accordance with the ILSMT asset level of repair review and approval procedures.

2.2.1.3 Vendor Level Maintenance

Vendor Level maintenance is defined as contracted services. It may be contracted services for on-site or off-site maintenance, or repair of one item, or an ongoing renewable contract. The RLA, accomplished by the CRWMS M&O, will provide the data to help determine the most cost-effective means to repair or maintain site assets. During the LSA of the On-Equipment and Off-Equipment Levels of maintenance each item will be analyzed for level of repair and the recommended repair level will be identified in the LSAR. The RLA will then be accomplished and submitted to the ILSMT in accordance with the ILSMT asset level of repair review and approval procedures. Vendor Level maintenance consideration will begin in the conceptual design phase and continue through the operation phase. Initial Vendor Level identification and documentation will be completed 90 days after detailed design review and implemented at the operation phase.

2.2.2 Maintenance Concept Tradeoffs

Maintenance Concept tradeoffs identified during the LSA process will be presented to the ILSMT for review and YMSCO approval. Following approval, the CRWMS M&O ILSM will document the tradeoffs in this ILSP at the next periodic update.

2.3 LSA

The LSA process is a systematic analysis process composed of scientific and engineering tasks whose purpose is to ensure that supportability is suitably considered and incorporated into the MGDS. The LSA process will begin during the conceptual design phase and continue through construction and into the operation phase. The CRWMS M&O will be the lead and integrating contractor for ensuring the LSA process is accomplished and documented for each task, and ILS elements have been addressed and documented. The

tasks, identified below, represent the most cost-effective way to obtain complete supportability data.

2.3.1 LSA Task Description

The following paragraphs define the task necessary to ensure a thorough LSA process is accomplished.

2.3.1.1 Development of an Early LSA Strategy

The purpose of this task is to develop a proposed LSA program strategy for use early in the acquisition program and to identify the LSA tasks and sub-tasks which provide the best return on investment.

This ILSP is part of this task. The CRWMS M&O will be responsible for ILS involvement in the present MGDS, development of an LSA strategy for the potential repository, and ensuring that logistical issues and concerns are addressed to the YMSCO early in the MGDS design.

2.3.1.2 Logistic Support Analysis Plan (LSAP)

The purpose of this task is to develop an LSAP that identifies and integrates all LSA tasks, identifies management responsibilities and activities, and outlines the approach toward accomplishing LSA tasks identified in this ILSP.

The CRWMS M&O will develop the LSAP and obtain signature coordination within six months of approval of the logistics data base. The LSAP coordination agencies/contractors will be the same as for this ILSP. The YMSCO will be the approval authority for the LSAP.

2.3.1.3 Program and Design Reviews

The purpose of this task is to establish a requirement for the performing activity to plan and provide for official review and control of released design information with LSA program participation in a timely and controlled manner, and to ensure that the LSA program is proceeding in accordance with the contractual milestones so that the supportability and supportability-related design requirements will be achieved.

The CRWMS M&O will be required to provide LSA considerations, status, and schedule relative to each design review (Conceptual, Preliminary, and Detailed). The logistic information will be presented along with and in the same manner as the design review format.

2.3.1.4 Mission Hardware, Software, and Support System Standardization

The purpose of the mission hardware, software, and support system standardization task is to define supportability and supportability-related design constraints for the new system/equipment based on existing and planned logistic support resources which have benefits due to cost, manpower, personnel, readiness, or support policy considerations; and to provide input into mission hardware and software standardization efforts.

The CRWMS M&O will identify supportability issues relative to maintaining hardware, software, and support systems during the LSA process. Unresolved issues will be presented to the ILSMT for action and/or resolution.

2.3.1.5 Comparative Analysis

The purpose of comparative analysis is to select or develop a Baseline Comparison System representing characteristics of the new system/equipment for (1) projecting supportability related parameters, making judgments concerning the feasibility of the new system/equipment supportability parameters, and identifying targets for improvement; and (2) determining the supportability, cost, and readiness drivers of the new system/equipment.

The CRWMS M&O will identify candidate systems, equipment, or processes for comparative analysis. The analyst will present the candidates to the ILSMT for review, action, and tracking. Upon completion of the comparative analysis the ILSMT will review and forward it to the DOE/appropriate MGDS Participant. Results of the comparative analysis will be returned to the ILSMT administrator with an information copy sent to the originating analyst.

2.3.1.6 Technological Opportunities

The purpose of technological opportunities task is to identify and evaluate design opportunities for improvement of supportability characteristics and requirements in the new system/equipment.

The CRWMS M&O will identify supportability items during the LSA process and forward recommendations to the ILSMT in the same manner described for the comparative analysis candidates above.

2.3.1.7 Functional Requirements Identification

The purpose of functional requirements identification is to identify the operations, maintenance, and support functions that must be performed in the intended environment for each system/equipment alternative under consideration; to identify the human performance requirements for operations, maintenance, and support; and to document those requirements in a task inventory.

The CRWMS M&O will develop the waste processing functional flows. The upper-level functional flows will be completed 90 days after receipt of a YMSCO-approved flow development package. The CRWMS M&O will continue development of operations functional flows for the waste handling processes and sub-surface operations.

Functional flows will be numbered in sequence and begin at the upper-most level of the operations processes. Each of the major processes will be broken down into detailed functional flow blocks until the sequence of actions necessary to perform each task in sequence is clearly visible. During the flow process the analyst must consider all resources needed to perform each task and document those requirements as outlined in the YMP SEMP. The functional flows will be reviewed by the ILSMT and approved by the YMSCO in accordance with the ILSMT procedures.

2.3.1.8 Evaluation of Alternatives and Tradeoff Analysis

The purpose of evaluation of alternatives and tradeoff analysis is to determine the preferred support system alternative(s) for each system/equipment alternative, and to participate in alternative system tradeoffs to determine the best approach (support, design, and operation) that satisfies the need with the best balance between cost, schedule, performance, readiness, and supportability. These studies will draw from any known information sources available, such as ongoing and related construction/tunneling projects.

The evaluations will be submitted to the ILSMT for review, tracking, and actions as necessary. See the YMP SEMP for trade study definition, methodology, and quality assurance.

2.3.1.9 Task Analysis

The purpose of task analysis is to analyze required O&M tasks for the new system/equipment and to:

- Identify logistic support resource requirements for each task.
- Identify new or critical logistic support resource requirements.
- Identify transportability requirements.
- Identify support requirements which exceed established goals, threshold, or constraints.
- Provide data to support participation in the development of design alternatives to reduce costs, optimize logistic support resource requirements, or enhance the operation.
- Provide spares data for preparation of required ILS documents (technical manuals, training programs, manpower and personnel lists, etc.).

The CRWMS M&O will write the task analysis procedural steps or identify and recommend commercial manuals for O&M tasks. Tasks considered to have acceptable documentation will be presented by the CRWMS M&O logistic analyst at the LSAR reviews for ILSMT review and YMSCO approval. Commercial manuals recommended for use will be available for review at the LSAR reviews. LSAR functional requirements (tools, equipment, facilities, etc.) must still be entered in the LSAR data base even though approval may have been received not to enter the task analysis in the LSAR data base.

2.3.1.10 Post Production Support (PPS) Analysis

The purpose of PPS analysis task is to analyze life cycle support requirements of the new system/equipment prior to closing of production lines to ensure that adequate logistic support resources will be available during the system's/equipment's remaining life.

The CRWMS M&O will perform PPS analysis on all developed systems and/or equipment.

2.3.2 LSAR

The LSAR is a means for the CRWMS M&O to document the results of the LSA. The ILSMT, with YMSCO ILSM approval, will prescribe the LSAR format, where and who will maintain the data, and data base access authorization.

During the LSA process, accepted industry standard maintenance tasks and tasks that may only require a commercial manual will be identified in the LSAR, and presented to the ILSMT for review and YMSCO ILSM approval. Tasks determined not to require task analysis or written procedures will be so documented in the LSAR; however, all support requirements relating to that task will be identified and documented in the LSAR.

The LSAR documentation will begin immediately following LSAR data base installation and personnel training. LSAR documentation will continue through each design phase with initial completion 90 days after detailed design approval. The LSAR data base will be updated as necessary throughout the construction and operational phases.

2.3.3 Contractor/YMSCO Interrelationship

The CRWMS M&O will be responsible for the management and implementation of the ILS program. The YMSCO has the responsibility for the YMP and will control and approve all major ILS milestone actions.

2.3.4 LSA/LSAR Reviews

The LSA/LSAR review guidelines will be established by the ILSMT within six months following the approval of an LSAR data base.

2.3.5 Life Cycle Cost (LCC)

LCC is the total cost of acquisition, ownership, and disposal of a system over its lifetime. The LCC analysis categories are outlined in the YMP SEMP.

2.3.6 Product Performance Agreements (Warranty)

A warranty plan has not yet been developed. When it is completed the warranty information applicable to the ILSP will be added.

2.3.7 Government Furnished Equipment (GFE)

GFE will be addressed in subsequent revisions.

2.4 ILS ELEMENTS

The following ILS elements will be used by the CRWMS M&O during the LSA process and the results entered in the LSAR.

2.4.1 Maintenance Planning

Maintenance Planning is the process conducted to evolve and establish maintenance concepts, plans, and requirements for the on- and off-equipment maintenance and repair to be performed during the life of the system or equipment. The CRWMS M&O will conduct LSA based on the following Maintenance Planning requirements for all processing and support equipment in their area of responsibility.

Maintenance Planning requirements will include consideration of the sources of repair, site activation planning, maintenance task levels, LSA tasks to identify maintenance requirements, RLA, post site activation, and PPS.

2.4.2 Manpower and Personnel

Manpower and Personnel focuses on the identification of personnel and skill requirements needed to operate and support the MGDS over its lifetime.

The supporting personnel skills for the MGDS will be identified and documented in the LSAR by the CRWMS M&O for each operations, maintenance, and support task to be performed.

Personnel health and safety issues are of paramount consideration throughout the LSA process. Warnings, cautions, and notes will be used throughout the task analysis portion of the LSAR for waste handling procedures and all hazardous tasks. Those task steps determined to be hazardous will be identified in the LSAR and preceded by an appropriate warning, caution, or note.

2.4.3 Supply Support

Supply Support is that effort which provides timely and adequate spares, repair parts, and special supplies to satisfy operation and maintenance functions during the life cycle of the YMP. It encompasses all the management actions and techniques necessary to determine requirements to acquire, catalog, receive, store, transfer, and issue spares and repair parts. Specifically, Supply Support includes development of the provisioning strategy followed by actual provisioning for initial support of the end item and related ancillary items. It also includes acquiring, distributing, and replenishing inventory spares and repair parts, and planning for direct or competitive spares procurement. Parts and spares required to be in place prior to site operation will be identified in the LSAR. Prior to provisioning, all known information sources will be polled to establish/validate failure history, failure probability, and any other information pertinent to cost-effective procurement of spares and parts.

The surface and subsurface warehouses will store the parts and supplies necessary for maintaining the respective equipment. An inventory control system containing, as a minimum, a complete list of parts required for every piece of equipment, a bin location code, current inventory, reorder capability, and cross-reference to equipment illustrated parts breakdowns will be identified and recommended to the YMSCO by the CRWMS M&O with the coordination of the participant contractors. The data for the inventory control system will be derived from the LSAR data base.

2.4.3.1 Provisioning Strategy

- MGDS Participant contractors will submit DOE purchase assets recommendations in accordance with the ILSMT procedures.

The Provisioning Strategy for the MGDS is to identify and purchase the first year operational spares listed in the LSAR tables prior to site activation. Spares acquisition integrated with production of development items will be identified in the LSAR tables.

Initial Spares Breakout identification and recommendations will be accomplished during the LSA process and documented in the LSAR data base. The ILSMT will review and approve the Initial Spares Breakout listing.

2.4.4 Support Equipment

Support Equipment includes all equipment items required to perform the support and operations function for the MGDS.

All the Support Equipment requirements will be identified during the LSA process. Those equipment requirements will be documented in the LSAR and each requirement will be reviewed by the ILSMT to ensure the recommended equipment is appropriate for the task and to avoid duplication of equipment.

Anticipated equipment requiring development will be identified early in the MGDS. Existing commercial off-the-shelf equipment will be given first consideration during the LSA process.

2.4.5 Technical Manuals

During the LSA process each task will be analyzed to determine the need for written procedures. Factors that will be considered include the task complexity, safety, and seldom performed tasks.

Tasks determined by the YMSCO ILSM to require technical manuals to be written will be identified during the LSA process and presented to the ILSMT for review and YMSCO approval. Following approval of the requirement for the manual the logistic analyst will document a step-by-step task analysis in the LSAR data base. The task analysis will be written in industry standard format. The task analysis will then be reviewed by the appropriate ILSMT members for content and accuracy. Validation and verification of the technical manual will be accomplished six months prior to site, equipment, facility, and/or system activation.

2.4.6 Training and Training Support

Training and Training Support includes the processes, procedures, techniques, training devices, and other equipment used to train personnel to operate and support a system. This includes individual and team training; new equipment training; initial, formal, and on-the-job training; and logistic support planning for training equipment acquisition and installation.

2.4.7 Computer Resources Support

Commercial computer resources will be the first consideration for computer software and hardware for O&M purposes. The LSA process will identify and document all O&M computer resource requirements in the LSAR. Sources for repair of hardware and maintenance of software will be identified.

2.4.8 Facilities

The goal of the Facilities program is to ensure all required logistic support facilities along with associated utilities and equipment are available at site activation. The term Facilities includes any buildings, structures, special installed equipment, utilities, pavements, and the underlying ground.

Early identification of logistic facility requirements is essential. MGDS Participant contractor requirements must be specific and identified relative to the specific requirements for the item or process under analysis. Early analysis of the logistic tasks in terms of facility requirements must be accomplished before the facility design is completed. Identification of facility requirements will begin during the development of the functional flows and continue through the detailed design phase. All facility requirements will be documented in the LSAR.

2.4.9 Packaging, Handling, Storage, and Transportation (PHS&T)

For the purposes of this ILSP, PHS&T will encompass those items required to support O&M. During the LSA process the PHS&T requirements will be considered for each item and documented in the LSAR. Hazardous materials PHS&T requirements will be identified and documented.

2.4.10 Design Interface

The ILSMT will be responsible to communicate logistic-related design parameters to DOE, other contractors, and design engineers. Early analysis of the tasks to be performed must be accomplished by the logistic analyst to present logistic-related issues to the scheduled design reviews. Unresolved logistic-related issues will be documented and presented to the ILSMT.

RAM parameters and requirements are identified in the *Reliability, Availability, and Maintainability Plan*, YMP/93-15.

APPENDIX A

LOGISTIC SCHEDULES

APPENDIX A

LOGISTIC SCHEDULES

(Logistic schedules have not been developed. When they are, they will be as Appendix A.)

APPENDIX B

REFERENCES

APPENDIX B

REFERENCES

NOTE: Unless otherwise stated, refer to the latest revision or interim change of the referenced document.

Identifier	Title
Public Law 97-425	Nuclear Waste Policy Act of 1982
10 CFR 60	Disposal of High-Level Radioactive Wastes in Geologic Repositories
DOE/RW-0051	OCRWM Systems Engineering Management Plan
DOE/RW-0333P	Quality Assurance Requirements and Description
YMP/93-15	Reliability, Availability, and Maintainability Plan
YMP/CC-0007	Systems Engineering Management Plan, Revision 4, Draft "A"
YMP/CM-0009	Conceptual Design of a Repository (Basis for Site Characterization Plan, Chapter 8)

APPENDIX C

ACRONYMS AND ABBREVIATIONS

APPENDIX C

ACRONYMS AND ABBREVIATIONS

CRWMS	Civilian Radioactive Waste Management System
DOE	U.S. Department of Energy
GFE	Government Furnished Equipment
ILS	Integrated Logistic Support
ILSM	Integrated Logistic Support Manager
ILSMT	Integrated Logistic Support Management Team
ILSP	Integrated Logistic Support Plan
ISP	Integrated Support Plan
LCC	Life Cycle Cost
LRU	Line Replaceable Unit
LSA	Logistic Support Analysis
LSAP	Logistic Support Analysis Plan
LSAR	Logistic Support Analysis Record
M&O	Management and Operating Contractor
MGDS	Mined Geologic Disposal System - Site Characterization, Engineered Barrier, and Repository
NWPA	Nuclear Waste Policy Act
OCRWM	Office of Civilian Radioactive Waste Management
OGD	Office of Geologic Disposal
O&M	Operations and Maintenance
PHS&T	Packaging, Handling, Storage, and Transportation
PPS	Post Production Support
RAM	Reliability, Availability, and Maintainability
RLA	Repair Level Analysis
SEMP	Systems Engineering Management Plan
YMP	Yucca Mountain Site Characterization Project
YMSCO	Yucca Mountain Site Characterization Office